WHAT IS CLAIMED IS:

1. A method of decorrelating M control signals in a multibranch feedforward linearizer having M monitor signals and a first signal, said method comprising the steps of:

performing bandpass correlations pairwise between the M monitor signals to form a signal correlation matrix, each pairwise bandpass correlation a component of the signal correlation matrix;

inverting the signal correlation matrix;

performing bandpass correlation between the first signal and each of the M monitor signals to form a correlation vector, each bandpass correlation being a component of the correlation vector; and

computing the M control signals using the inverted signal correlation matrix and the correlation vector.

2. A method according to Claim 1, wherein the steps are iteratively repeated.

3. A method according to Claim 1, wherein the computing step also uses a scalar step size parameter.

4. A method according to Claim 1, wherein **a** is a control signal vector of M length, $\mathbf{R}_a$ is an MxM signal correlation matrix, $\mathbf{R}_a^{-1}$ is the inverse of the signal correlation matrix, $\mathbf{r}_{ae}$ is a correlation vector of M length, s is a scalar step size parameter, and n is an iteration, and the M control signals of the n+1 iteration are computed as follows:

$$\mathbf{a}(n+1) = \mathbf{a}(n) + s\mathbf{R}_a^{-1}\mathbf{r}_{ae}(n).$$

5. A method according to Claim 1, wherein the first signal is an error signal of the linearizer.

6. A method according to Claim 1, wherein the first signal is an output signal of the linearizer.

7. A method of decorrelating M control signals in a multibranch feedforward linearizer having M monitor signals and a first signal, said method comprising the steps of:

performing partial correlations pairwise between the M monitor signals at N frequencies;

for each monitor signal, summing the pairwise partial correlations over N frequencies to form a signal correlation matrix, each sum being a component of the signal correlation matrix;

inverting the signal correlation matrix;

performing partial correlations between the first signal and each of the M monitor signals over N frequencies;

for each monitor signal, summing the partial correlations over N frequencies to form a correlation vector, each sum being a component of the correlation vector; and

computing the M control signals using the inverted signal correlation matrix and the correlation vector.

8. A method according to Claim 7, wherein the steps are iteratively repeated.

9. A method according to Claim 7, wherein the computing step also uses a scalar step size parameter.

10. A method according to Claim 7, wherein $\mathbf{a}$ is a control signal vector of M length, $\mathbf{R_a}$ is an MxM signal correlation matrix, $\mathbf{R_a}^{-1}$ is the inverse of the signal correlation matrix, $\mathbf{r_{ae}}$ is a correlation vector of M length, s is a scalar step size parameter, and n is an iteration, and the M control signals of the n+1 iteration are computed as follows:

$$\mathbf{a}(n+1) = \mathbf{a}(n) + s\mathbf{R}_a^{-1}\mathbf{r}_{ae}(n).$$

11. A method according to Claim 7, wherein the first signal is an error signal of the linearizer.

12. A method according to Claim 7, wherein the first signal is an output signal of the linearizer.

13. A method for generating M control signals in a M branch signal adjuster for a linearizer, where M is greater than 1, the signal adjuster having M branch signals and a corresponding M monitor signals,and M observation filters between the respective M branch and monitor signals, the method comprising the steps of:

estimating the gains of the M observation filters; and

decorrelating the M control signals using the estimated gains of the M observation filters.

14. A method of computing M control signals in a M branch signal adjuster for a linearizer, where M is greater than 1, the signal adjuster having M branch signals and a corresponding M monitor signals, a first signal, and M observation filters between the M branch and monitor signals, said method comprising the steps of:

estimating the gains of M observation filters;

performing bandpass correlations pairwise between the M monitor signals to form a signal correlation matrix, each pairwise bandpass correlation being a component of the signal correlation matrix;

adjusting the components of the signal correlation matrix using the corresponding estimated gains of the M observation filters;

inverting the signal correlation matrix;

performing bandpass correlation between the first signal and each of the M monitor signals to form a correlation vector, each bandpass correlation being a component of the correlation vector;

adjusting the components of the correlation vector using the corresponding estimated gains of the M observation filters; and

computing the M control signals using the inverted signal correlation matrix and the correlation vector.

15. A method of computing M control signals in a M branch signal adjuster for a linearizer, where M is greater than 1, the signal adjuster having M branch signals and a corresponding M monitor signals, a first signal, and M observation filters between the M branch and monitor signals, said method comprising the steps of:

determining the gains of M observation filters;

performing partial correlations pairwise between the M monitor signals at N frequencies;

for each monitor signal, summing the pairwise partial correlations over N frequencies to form a signal correlation matrix, each sum being a component of the signal correlation matrix;

adjusting the components of the signal correlation matrix using the corresponding estimated gains of the M observation filters;

inverting the signal correlation matrix;

performing partial correlations between the first signal and each of the M monitor signals over N frequencies;

for each monitor signal, summing the partial correlations over N frequencies to form a correlation vector, each sum being a component of the correlation vector;

adjusting the components of the correlation vector using the corresponding estimated gains of the M observation filters; and

computing the M control signals using the inverted signal correlation matrix and the correlation vector.

16. A linearizer for an amplifier comprising:

an FIR signal adjuster having two signal branches, wherein the power of the signals on each branch are unequal; and

an adaptation controller for decorrelating a plurality of control signals for said FIR signal adjuster.

17. A linearizer for an amplifier comprising:

a signal adjuster having three or more signal branches; and

an adaptation controller for decorrelating a plurality control signals for said signal adjuster.

18. A linearizer for an amplifier comprising:

a non-FIR signal adjuster having two or more signal branches; and

an adaptation controller for decorrelating a plurality of control signals for said non-FIR signal adjuster.

19. A method according to Claim 1, wherein $\mathbf{a}$ is a control signal vector of M length, $\mathbf{R}_a$ is an MxM signal correlation matrix computed as the weighted sum of measured signal correlation matrices $\mathbf{R}_a(n)$ at successive iteration steps n = 1, 2, 3, . . ., $\mathbf{R}_a^{-1}$ is the inverse of the signal correlation matrix, $\mathbf{r}_{ae}$ is a correlation vector of M length computed as the weighted sum of measured correlation vectors $\mathbf{r}_{ae}(n)$ at successive iteration steps, and $\mathbf{a}$ is computed by least squares as $\mathbf{a} = \mathbf{R}_a^{-1}\,\mathbf{r}_{ae}$.

20. A method according to Claim 1, wherein $\mathbf{a}$ is a control signal vector of M length, $\mathbf{R}_a$ is an MxM signal correlation matrix, $\mathbf{R}_a^{-1}$ is the inverse of the signal correlation matrix, and $\mathbf{a}$ and $\mathbf{R}_a^{-1}$ are computed iteratively according to a recursuve least squares method.

21. A method according to Claim 7, wherein $\mathbf{a}$ is a control signal vector of M length, $\mathbf{R}_a$ is an MxM signal correlation matrix computed as the weighted sum of measured signal correlation matrices $\mathbf{R}_a(n)$ at successive iteration steps n = 1, 2, 3, . . ., $\mathbf{R}_a^{-1}$ is the inverse of the signal correlation matrix, $\mathbf{r}_{ae}$ is a correlation vector of M length computed as the weighted sum of measured

correlation vectors $\mathbf{r}_{ae}(n)$ at successive iteration steps, and $\mathbf{a}$ is computed by least squares as $\mathbf{a} = \mathbf{R}_a^{-1}\,\mathbf{r}_{ae}$.

22. A method according to Claim 7, wherein $\mathbf{a}$ is a control signal vector of M length, $\mathbf{R}_a$ is an MxM signal correlation matrix, $\mathbf{R}_a^{-1}$ is the inverse of the signal correlation matrix, and $\mathbf{a}$ and $\mathbf{R}_a^{-1}$ are computed iteratively according to a recursuve least squares method.

23. A method for generating a plurality of control signals for a FIR signal adjuster of an amplifier linearizer having two branches, each branch having unequal power, comprising the steps of:

    decorrelating a plurality of monitor signal of the signal adjuster; and

    computing said plurality of control signals accounting for the decorrelated monitor signals.

24. A method according to Claim 23, in which the decorrelating step comprises:

    correlating the monitor signals between themselves to form a signal correlation matrix;

    inverting the signal correlation matrix; and

    correlating an error signal of the linearizer and the monitor signals to form a correlation vector.

25. A method according to Claim 24, wherein the computing step uses the inverted signal correlation matrix and the correlation vector to generate the control signals.

26. A method for generating a plurality of control signals for a signal adjuster of an amplifier linearizer having three or more branches, comprising the steps of:

decorrelating a plurality of monitor signal of the signal adjuster; and

computing said plurality of control signals accounting for the decorrelated monitor signals.

27. A method according to Claim 26, in which the decorrelating step comprises:

correlating the monitor signals between themselves to form a signal correlation matrix;

inverting the signal correlation matrix; and

correlating an error signal of the linearizer and the monitor signals to form a correlation vector.

28. A method according to Claim 27, wherein the computing step uses the inverted signal correlation matrix and the correlation vector to generate the control signals.

29. A method for generating a plurality of control signals for a non-FIR signal adjuster of an amplifier linearizer having two or more branches, comprising the steps of:

decorrelating a plurality of monitor signal of the signal adjuster; and

computing said plurality of control signals accounting for the decorrelated monitor signals.

30. A method according to Claim 29, in which the decorrelating step comprises:

correlating the monitor signals between themselves to form a signal correlation matrix;

inverting the signal correlation matrix; and

correlating an error signal of the linearizer and the monitor signals to form a correlation vector.

31. A method according to Claim 30, wherein the computing step uses the inverted signal correlation matrix and the correlation vector to generate the control signals.

32. A method for an amplifier linearizer having a signal adjuster with two or more branches, comprising the steps of:

self-calibrating the signal adjuster; and

decorrelating the signal adjuster.

33. A method according to Claim 32, wherein the self-calibrating and decorrelating steps comprise the substeps of:

computing an observation filter gain for each branch of the signal adjuster;

correlating monitor signals of the signal adjuster between themselves to form a signal correlation matrix; and

adjusting the signal correlation matrix using the observation filter gains.

34. A method according to Claim 33, wherein the self-calibrating and decorrelating steps further comprise the substeps of:

inverting the adjusted signal correlation matrix; and

correlating an error signal of the linearizer and the monitor signals to form a correlation vector; and

computing said plurality of control signals using the adjusted inverted signal correlation matrix and the correlation vector to generate the control signals.

35. A linearizer for an amplifier comprising:

a signal adjuster having two or more signal branches; and

an adaptation controller for self-calibrating and decorrelating a plurality of control signals for said signal adjuster.